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### **Real value added estimation of Real Estate (LIU Nan, NBS)**

#### *Comments on paper by Roger Jullion, Statistics Canada*

Housing services are an important component in measuring GDP. They form part of the real estate industry in production-based GDP and are included in personal expenditure within expenditure-based GDP. Their share of GDP is significant suggesting that the quality of estimation can impact on the quality of the overall GDP estimates.

In addition to real estate rentals paid, an imputation is made for the rental value of owner occupied housing. Conceptually this value represents the estimated rent that the owner would have spent had he been renting his identical home on the market. In other words the owner occupant is considered a landlord renting the dwelling to himself. Including an estimate for imputed owner occupied rents in GDP is necessary to ensure that GDP remains invariant to shifts between tenant occupancy and owner occupancy.

The estimation of housing services at NBS has improved in recent years. Prior to 2004, nominal housing services for owner occupied dwellings were estimated as being equal to depreciation. It was recognized at the time that this estimation method significantly underestimated owner occupied housing services where they accounted for about 2% of GDP.

The estimation method was improved through a joint Statistics Canada / NBS project team that met between 1999 and 2002. As is the case in many countries, the Chinese rental housing market is limited, particularly in the rural areas, which meant that the rental equivalence approach would lead to questionable results. For this reason, it was decided to adopt a user cost approach where rents are approximated as the sum of rental costs. The revised methodology includes the sum of depreciation, maintenance costs and management fees as an estimate of the nominal rental value. This raised the share of owner occupied housing services to about 5% of GDP. This method was used for both urban and rural dwellings. Since data on interest payments and property taxes were not available at the time they were not included in the estimate. In addition, net profit (net rental income) was assumed to be zero.

All dwellings are included, including dwellings owner occupied and owned by government as well as dwellings offered by state enterprises or institutions to their employees. Separate estimates are made for owner occupied dwellings in urban areas and owner occupied dwellings in rural areas. Estimates were prepared by province.

Repair and maintenance costs were estimated as the stock of dwellings multiplied by an average maintenance and repair cost per square meter obtained from household survey information.

Management fees refer to the fees paid to housing services administration or companies for housing management, namely the fees paid by government, enterprises or institutions for the dwellings they provide to their employees or by urban residents for their own housing services. These fees are estimated on the basis of an average per square meter and when multiplied by the dwelling stock in square meters gives an estimate for the economy as a whole.

Depreciation is estimated using a PIM model produced jointly by Statistics Canada and NBS. Essentially an initial stock was estimated in 1980 from investment data available for the period 1952 to 1980. From 1980, data on housing completions, investment in renovations and the value of demolitions are used to keep the stock up to date. Geometric depreciation rates are used which are 3% for rural dwellings and 2% for urban dwellings.

The author mentions that the nominal estimates could be improved by including estimates for interest costs on housing loans and estimates of property taxes. The availability of property tax data from municipal administrative data could be explored as well as interest on housing loans from banking data. If the NBS were to adopt the rental equivalence method, the author would like to see an improved rental sample survey.

For constant prices, the NBS paper states that the renting price index of houses is used as the deflator. This could be problematic since there appears to be an inconsistency between the nominal series to be deflated and the rental price deflator with respect property taxes and interest on housing loans. The paper suggests that these rental prices, which are only available for large cities, may not be representative of owner occupied rents in smaller cities and rural areas. Earlier methodological notes suggested that the national construction and installation price index is used to deflate both repairs and maintenance and management fees and constant price depreciation is derived from the PIM model. Perhaps this could be clarified.

Recognizing that reasonable estimates of owner occupied rentals cannot be estimated using the rental index deflator, a volume indicator based on the growth rate urban owner occupied housing area was used to directly estimate the constant price growth of urban owner occupied dwelling housing services. A similar method was used for rural housing services.

The paper compares the two sets of volume estimates, the rental price index method and the volume extrapolation method and concludes that the growth rates from the volume extrapolation seem more reasonable.

While NBS has improved its estimation methods significantly for owner occupied rents, a couple of suggestions come to mind. For current prices, property tax data from municipal authorities could be explored and interest on housing loans could be obtained from bank reports. In addition, better survey coverage of rental data would improve the estimates. Many countries are faced with the issue to how to use market rents as a proxy for owner occupied rents.

In Canada we use the rental equivalence method to estimate nominal housing rentals. We do make estimates for the differences in quality, mainly size, between rental dwellings and owner-occupied dwellings. However, the rental market is limited in Canada for those homes that are typically owner occupied e.g. single detached homes. Average rents by province are collected from our Labour Force Survey and used in the CPI. Average rents by province by type of dwellings are also available from our national housing authority. We use both sources when compiling our national accounts estimates. In Canada we compile separate housing services estimates for tenant occupied and owner occupied dwellings. The concept of gross housing services starts with an estimate of gross space rent which excludes utilities. The same concept of rental is used in China except at the present time mortgage interest and property taxes are not included. When expenses such as repair and maintenance, insurance, mortgage interest, property taxes, management fees and depreciation are deducted from the gross space rents an estimate of net rents is estimated.

At Statistics Canada, our constant price estimates for rents is derived from the PIM model. The PIM model provides an estimate of the constant price housing stock and this becomes our volume extrapolator for tenant occupied and owner occupied rents. The stock is built up using new housing completions and renovations with adjustments for demolitions and depreciation.

Given that NBS has a PIM model, could consideration be given to using the constant price housing stock from the model and comparing these results to the two methods referred to in the paper. It would have the advantage of better reflecting quality improvements to housing through renovations that may not impact the square meters of the housing stock. In addition the new houses completed may have additional quality improvements that would not be reflected in the housing area estimates.